

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
3 February 2005 (03.02.2005)

PCT

(10) International Publication Number
WO 2005/010640 A2

(51) International Patent Classification⁷: **G06F**

(21) International Application Number:
PCT/IL2004/000696

(22) International Filing Date: 29 July 2004 (29.07.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
157199 31 July 2003 (31.07.2003) IL

(71) Applicants and

(72) Inventors: **TSOGLIN, Alexander Noson** [IL/IL]; 32 HaBa'al Shemtov, Apt.9, 58301 Holon (IL). **MARGOLIN, Arkady Hanon** [IL/IL]; 54/5 HaEshel Street, 22930 Hadera (IL).

(74) Agents: **LUZZATTO, Kfir** et al.; P.O. Box 5352, 84152 Beer Sheva (IL).

(81) Designated States (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM,

AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— *without international search report and to be republished upon receipt of that report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: NONINVASIVE MULTI-CHANNEL MONITORING OF HEMODYNAMIC PARAMETERS

(57) **Abstract:** A method and system for measuring the electrical impedance of sections of a living body. The measurement is carried out utilizing a plurality of electrodes each of which is disposed on a section of the living body, where the electrodes are capable of applying an electrical current through at least one probed section, and measure the electrical voltage over the probed section. The voltages over the probed sections are measured and the impedances (Z(t)) and their changes (ΔZ(t)), and the resistances R(t) and their changes (ΔR(t)), are calculated, by considering the electrical current distortion components resulting from the electrical currents flowing in the other sections which are not probed, utilizing an electrical model based on the distribution of the electrical currents through the body sections. The measuring is preferably performed by applying an electrical current through the probed section of the living body via a pair of electrodes, and measuring the electrical voltage over the probed section and over the other sections, applying an electrical current through one or more of the other sections and at each instance measuring the electrical voltage over the other sections; and calculating the impedance and resistance and the changes utilizing the measurements and the applied currents, according to the electrical model.



WO 2005/010640 A2